

DIABETES MELLITUS IN THE AETIOLOGY OF DUPUYTREN'S DISEASE

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In controlled clinical studies of adult diabetics a 42% incidence of signs of Dupuytren's disease was found. The incidence was highest in the older patients with a longer history of diabetes, but was not related to the severity of the diabetes. The features of Dupuytren's disease in the diabetics has a distinctive pattern, being more severe in men than women and, compared with controls, having a radial shift towards the middle finger. The disease was mild and of benign prognosis, rarely needing operation. In a further study, 13% of patients with Dupuytren's disease were found to have a raised blood glucose level.

The question is posed as to whether the biochemical disturbance causes the Dupuytren's disease or whether the pattern of inheritance predisposes to both Dupuytren's disease and diabetes.

"Retraction of the fingers, gentlemen, and particularly that of the ring-finger, has been observed for many years, but it is only very lately that the cause of this deformity has been investigated with success." Thus spoke the Baron Dupuytren at the Hotel Dieu in Paris 150 years ago (1834). However, his apparent optimism has hardly been realised and Hueston (1974) summarised the current situation well, stating that "students of this condition all feel that the solution to the enigma of Dupuytren's contracture must lie just around the next corner, but as each corner is turned, we find another ahead of us".

Remarkably little has been learned of the aetiology of the condition during this century though it affects a quarter of the male old-age pensioners in the United Kingdom (James 1969). A similarly high incidence has been reported from Australia (Hueston 1960) and from Scandinavia (Skoog 1948; Mikkelsen 1972), but the condition is rare amongst the Chinese, Indian and Negro races (Clarkson and Pelly 1962). It is interesting to reflect that these races are more prone to keloid scar formation. Not only are there racial differences in incidence but also in the pattern of Dupuytren's disease (Hueston 1974).

The most potent known aetiological factor is inheritance (Ling 1963), and a genetic mechanism probably underlies the strong association with epilepsy (James 1969). Dupuytren himself was the first to imply an association with occupational factors, but this has been discounted in the population studies of Early (1962).

Early's studies also make injury seem an improbable aetiological factor, and Fisk (1974) agrees; Hueston (1974), on the other hand, has found that Dupuytren's disease may develop rapidly after injury, but believes this to be related more to swelling and immobility than to the injury *per se*. Immobility may underly the association with frozen shoulder (Early 1962) and with pneumonia and cerebrovascular accidents (Osborne, personal communication, 1981). Fisk (1974), however, has "emphasised that no variety of disease or injury, activity or occupation could induce Dupuytren's contracture in somebody who was not genetically so determined".

Reference to the literature reveals that an association between Dupuytren's contracture and diabetes has been frequently suggested (Greenwood 1927; Davis and Finesilver 1932; Wegmann, Gurtner and Munz 1966; Spring, Fleek and Cohen 1970; Schneider 1971; Günther and Miosga 1972; Revach and Cabilli 1972; Rand, Dinai and Sohar 1977). Within this group of reports the incidence of Dupuytren's disease varied between 1.6% and 32%; moreover some of the conclusions are open to question. In the series reported by Rand *et al.* (1977), for example, the incidence of Dupuytren's disease in the middle-aged and elderly controls was only 0.64%, a level so low as to cast some doubt upon their observations. The use of medical inpatients as a control group also may be of dubious validity. Two studies (Ziliotto 1967; Krall and Zorilla 1978) disclaim a relationship between Dupuytren's contracture and diabetes and there is clearly need for a new study, based on careful clinical examination of the hand by experienced surgeons.

METHODS

The diagnosis of Dupuytren's disease was made by the observation of one or more of the following four features: a palmar or digital nodule, tethering of palmar or digital skin, a pretendinous band, and digital contracture.

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Knuckle pads were recorded, but did not alone warrant making the diagnosis of Dupuytren's disease. Each feature was recorded also in terms of the five digital rays of the hand. The feet were not routinely examined.

All observations were compared with those in control patients (matched for decade and sex) who were seen in various fracture clinics, in the belief that this provided as unselected a group as one could obtain in a general hospital. The groups were subsequently compared by standard statistical methods. A number of studies were carried out.

A pilot study of 273 unselected adult diabetics (aged over 16 years) was carried out, without control patients, by a physician interested in diabetes (JGH). The second study was by the same specialist in conjunction with a hand surgeon (JN); together they examined 122 unselected diabetic outpatients. A control series of 122 patients matched for age and sex were seen by the hand surgeon in his fracture clinics. The third study involved a further series of 150 outpatients and the same number of controls who were examined to derive data on the distribution of lesions within the hand.

Finally, in the fourth study, 134 patients attending a hand clinic (JN) had blood taken for a biochemical profile which included random glucose levels. The full results are reported elsewhere (Noble *et al.* 1984), but those patients with a raised level of blood glucose underwent a glucose tolerance test.

RESULTS

Pilot study. Of the 273 patients examined 18% were found to have lesions characteristic of Dupuytren's disease. The incidence in 120 men was 25% and in 153 women was 13%.

Controlled studies. Of the 122 randomly chosen adult diabetics, Dupuytren's disease was found in 27 of 65 men (41%) and 24 of 57 women (42%). The incidence of the four diagnostic features and of knuckle pads was compared between the sexes (Fig. 1). Bands and contractures predominated in the male diabetics, whereas knuckle pads and tethering were much commoner in female diabetics.

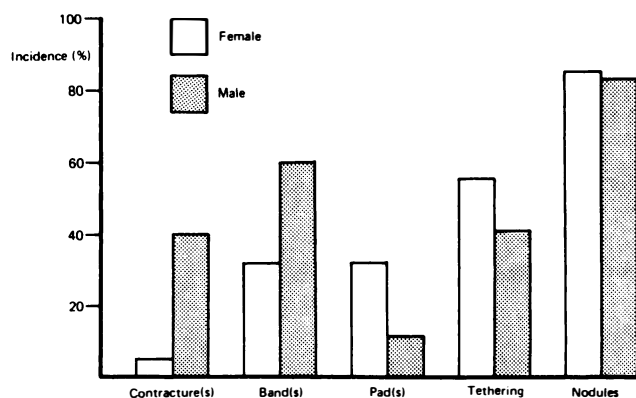


Fig. 1

The incidence of five features of Dupuytren's disease shown separately for men and women in 122 adult diabetic patients.

The incidence of Dupuytren's disease in these 122 diabetics was related to the time for which the patients had suffered from diabetes (Table I). Features of Dupuytren's disease were twice as common in those who had had diabetes for over 20 years than in those affected for five years or less.

Table I. Dupuytren's disease related to the duration of diabetes (122 patients)

Patients	Number	Duration of diabetes (years)			
		0-5	6-10	11-20	20
<i>With Dupuytren's disease</i>					
Men	27	12	5	5	5
Women	24	7	5	9	3
Subtotal	51	19	10	14	8
<i>Without Dupuytren's disease</i>					
Men	38	23	6	7	2
Women	33	20	6	5	2
Subtotal	71	43	12	12	4
TOTAL	122	62	22	26	12
Percentage with Dupuytren's disease	42	31	45	54	67

Other comparisons of diabetic patients with or without Dupuytren's disease are given in Table II. These details relate to 111 patients for whom adequate information was available. Those with Dupuytren's disease were on average 10 years older and had had diabetes for an average of five years longer. The proportion of patients under poor control or treated with insulin was similar in both groups.

In the third study 150 patients were similarly examined and compared with control patients matched

Table II. Severity of diabetes related to the incidence of Dupuytren's disease (111 patients)

	With Dupuytren's	Without Dupuytren's
Number of patients	51	60
Men	27	28
Women	24	32
Age (years)	62.8 (27-86)	53.3 (16-84)
Duration of diabetes (years)	11.06 (0.17-32)	6.5 (0.08-32)
<i>Treatment</i>		
Insulin	24	28
Tablets	24	30
Diet	3	2
Poor control (percentage)	22	20.5

for decade and sex (Fig. 2). The incidence of 43% with Dupuytren's disease in the diabetic group was significantly higher than that of 18% in the control group ($P < 0.001$). In the diabetic group there were 63 men with a 48% incidence of Dupuytren's signs, and 87 women with a 40% incidence. The incidence of each of the five

little fingers of the control patients than in their ring fingers, contractures predominated in the little fingers. **Blood glucose studies.** Eighteen of the 134 patients (13%) attending a hand clinic with Dupuytren's contracture were found to have a raised blood glucose level. Seven of these patients had a positive glucose tolerance test: in three it was taken before the diagnosis of Dupuytren's disease (ie, they were known diabetics), but in four patients the diagnosis of the diabetes came about as a result of the investigation of Dupuytren's disease.

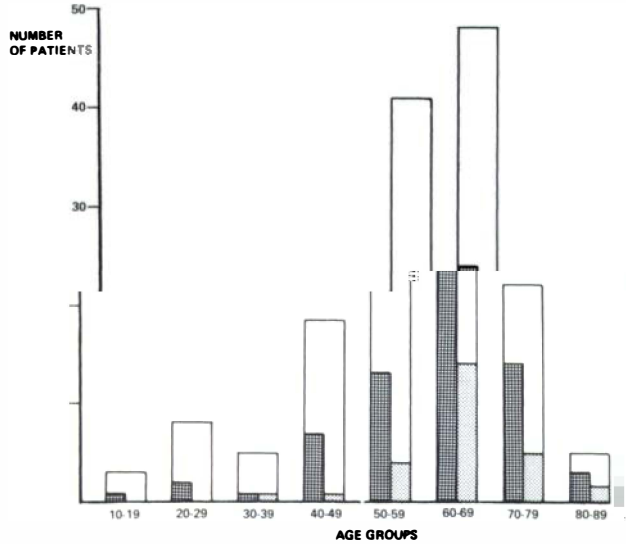


Fig. 2

The incidence of Dupuytren's disease in 150 diabetic patients and in 150 control patients matched for age and sex. □ Represents number of diabetics or controls seen; ■ number of diabetics with Dupuytren's; ◻ number of controls with Dupuytren's.

DISCUSSION

In these studies all the hands were examined by a hand surgeon, after the initial pilot study of 273 patients. The controls were matched for age and sex, and as they came from a fracture clinic were more likely to be a truly random control series than one provided from medical inpatients.

The incidence of signs of Dupuytren's disease in diabetic patients was much higher (42%) than previously reported. In a review of all the literature on the subject, Spring *et al.* (1970) quoted the incidence as being 3% to 32%. However, none of the observers whom he quoted were specially trained in examination of the hand. The overall incidence of 18% found in the pilot study of this paper was also reported by a physician who was not yet expert in this field and is more in keeping with the percentages quoted by Spring.

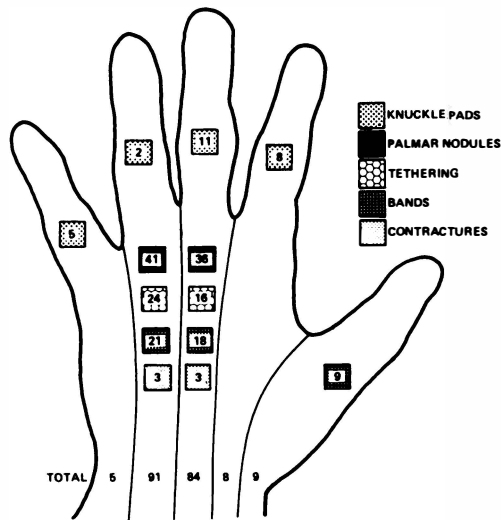


Fig. 3

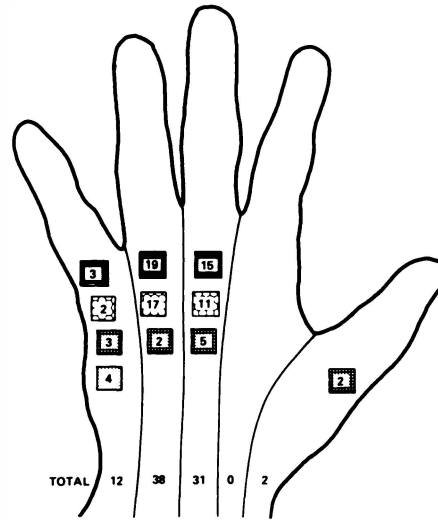


Fig. 4

Comparison of the incidence and distribution of the five features of Dupuytren's disease in 150 diabetic patients (Fig. 3) and 150 controls (Fig. 4).

features of Dupuytren's disease in each of the five digital rays of both hands of the 150 diabetic patients (Fig. 3) was compared with that of the 150 controls (Fig. 4). Knuckle pads were found only in the hands of diabetic patients, in which there was also a radial shift of signs of Dupuytren's disease, with an apparent freedom from signs in the fifth ray, and a higher incidence in the third ray. Although there were fewer abnormal signs in the

A distinct pattern of Dupuytren's disease in the diabetic patient came to be recognised. Signs are rare in the little finger and commoner in the middle finger. Severe contractures requiring operative treatment are seldom encountered, suggesting that the common diabetic Dupuytren's disease is mild and of benign prognosis. The only other factor with which the incidence of Dupuytren's disease in diabetes could be associated was

age. Severity of diabetes did not correlate with the incidence of signs of Dupuytren's disease. It was also interesting to note that the two most serious features of Dupuytren's disease, bands and contractures, were more common in diabetic men than women. There was no obvious reason for this other than the many different clinical patterns of Dupuytren's disease. The diabetic pattern could be of clinical importance in predicting disease, and an index group of patients with Dupuytren's signs in the fourth and third digital rays is being collected, so that in five years the group can be re-examined for the development of diabetes.

It has been previously reported that Dupuytren's disease is associated with liver disease, alcoholism and disturbed liver enzymes (Pojer, Radivojevic and Williams 1972). In a study associated with the present one (Noble *et al.* 1984) a very high incidence of disturbed liver enzymes has been noted, and also hypercholesterolaemia. Stack (personal communication, 1979) has had similar findings. These features are both well recognised in

diabetes. The question thus arises whether the biochemical disturbance causes Dupuytren's disease or whether a pattern of inheritance predisposes to Dupuytren's disease, hypercholesterolaemia, diabetes and their sequelae. An important question is whether extraneous factors such as hypercholesterolaemia, alcoholism, diabetes or the drugs used in the treatment of epilepsy can cause Dupuytren's disease, or potentiate an underlying tendency. Research into this aspect is being done in this department, using tissue culture techniques. Brickley-Parsons *et al.* (1981) reported that collagen production in culture was enhanced by factors from both the tissue and the serum of patients with Dupuytren's contracture.

This study has shown a pattern of Dupuytren's disease commonly associated with diabetes, and has also drawn attention to the fact that the presentation of signs of Dupuytren's disease may bring diabetes to light. The surgeon and the anaesthetist should therefore be vigilant for diabetes when treating patients with Dupuytren's contracture.

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